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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,951	11/03/2003	Seichi Watanabe	21604-00017-US	5042
30678	7590	03/25/2005	EXAMINER	
CONNOLLY BOVE LODGE & HUTZ LLP SUITE 800 1990 M STREET NW WASHINGTON, DC 20036-3425			TRAN, BINH Q	
			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/698,951	WATANABE ET AL. <span style="float: right;">es</span>	
	<b>Examiner</b>	<b>Art Unit</b>	
	BINH Q. TRAN	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>02/17/2004</u> .  | 6) <input type="checkbox"/> Other: ____.                                    |

### DETAILED ACTION

Receipt and entry of Applicant's Preliminary Amendment dated November 03, 2003 is acknowledged.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

***Claims 1, and 5 are rejected under 35 U.S.C. 102 (b) as being anticipated by Sudar et al. (Sudar ) (Patent Number 3,853,484).***

Regarding claim 1, Sudar discloses a exhaust gas purifying apparatus for purifying exhaust gas (20) by bringing the exhaust gas into contact with liquid catalyst (e.g. 38, 64) and solid catalyst (e.g. 70, 74), comprising an apparatus body (10) having a liquid reservoir chamber (e.g. 14, 16) where the liquid catalyst is reserved, a solid catalyst chamber (e.g. 66, 68) where the solid catalyst is arranged and a cooling mechanism (e.g. 26, 30, 52, 60) for cooling the liquid catalyst, wherein said cooling mechanism controls a temperature of the liquid catalyst so that up-

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and-down shift of a liquid level of the liquid catalyst in the liquid reservoir chamber is prevented as much as possible (e.g. See Figs. 1-6; col. 5, lines 23-65; col. 7, lines 25-67; col. 8, lines 1-67).

Regarding claim 5, Sudar further discloses a cooler using at least one of a heat pipe, a fin (e.g. 52, 60) or a cooling medium is used as the cooling mechanism (e.g. See Figs. 1-6; col. 5, lines 23-65; col. 7, lines 25-67; col. 8, lines 1-67).

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudar in view of design choice.***

Regarding claims 2-4, Sudar discloses all the claimed limitation as discussed above except that the liquid catalyst in the liquid reservoir chamber to a temperature not higher than 50 °C.

Regarding the specific range of the liquid catalyst in the liquid reservoir chamber, it is the examiner's position that a range not higher than 50 °C of the liquid catalyst in the liquid reservoir chamber, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as mass flow rate of the exhaust gas, as well as the size of the engine, properties of materials for making the catalyst, and the controlled temperature of the catalytic converter. Moreover, there is nothing in the record which establishes that the claimed

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parameters present a novel or unexpected result (See *In re Kuhle*, 562 F. 2d 553, 188 USPQ 7 (CCPA 1975)).

Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. *In re Dreyfus*, 22 CCPA (Patents) 830, 73 F.2d 931, 24 USPQ 52; *In re Waite et al.*, 35 CCPA (Patents) 1117, 168 F.2d 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. *In re Swenson et al.*, 30 CCPA (Patents) 809, 132 F.2d 1020, 56 USPQ 372; *In re Scherl*, 33 CCPA (Patents) 1193, 156 F.2d 72, 70 USPQ 204. However, even though applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. *In re Sola*, 22 CCPA (Patents) 1313, 77 F.2d 627, 25 USPQ 433; *In re Normann et al.*, 32 CCPA (Patents) 1248, 150 F.2d 627, 66 USPQ 308; *In re Irmischer*, 32 CCPA (Patents) 1259, 150 F.2d 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; *Minnesota Mining and Mfg. Co. v. Coe*, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; *Allen et al. v. Coe*, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

***Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudar in view of Kizer et al. (Kizer) (Patent Number 5,987,885).***

Regarding claim 6, Sudar discloses all the claimed limitation as discussed above except a cooling device that exhibits a cooling effect by a heat pipe and electric supply is used as the cooling mechanism.

Kizer teaches that it is conventional in the art, to use a cooling device that exhibits a cooling effect by a heat pipe and electric supply (e.g. 40, 42, 44) is used as the cooling mechanism (See Figs. 1-3; col. 3, lines 25-67; col. 4, lines 1-36) so as to control the temperature of the cooling system and the catalyst within a temperature range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use a cooling device that exhibits a cooling effect by a heat pipe and electric supply is used as the cooling mechanism of Sudar, as taught by Kizer for the purpose of controlling the temperature of the cooling system and the exhaust gas of an internal combustion engine, so as to control the temperature of the catalyst within a temperature range, and to further improve the performance of the engine and the efficiency of the emission device.

***Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudar in view of Bose (Patent Number 6,398,851).***

Regarding claims 7-9, Sudar discloses all the claimed limitation as discussed above except a solid catalyst plate is provided in each partial chamber, and the exhaust gas passes through each partial chamber in order and is in contact with the solid catalyst plate of each partial chamber is used as said solid catalyst chamber.

Bose teaches that it is conventional in the art, to use solid catalyst plate (74) is provided in each partial chamber, and the exhaust gas passes through each partial chamber in order and is in contact with the solid catalyst plate of each partial chamber is used as said solid catalyst chamber (See Fig. 1; col. 10, lines 1-48).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use a solid catalyst plate is provided in each partial chamber, and the exhaust gas passes through each partial chamber in order and is in contact with the solid catalyst plate of each partial chamber is used as said solid catalyst chamber of Sudar, as taught by Bose for the purpose of purifying exhaust gas of an internal combustion engine, so as to reduce the poisoned materials in the purifying catalyst and to reduce amount of nitrogen oxides in the exhaust gas of the lean-burn engine, and further improve the performance of the engine and the efficiency of the emission device.

***Claims 7-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudar in view of Yoshida et al. (Yoshida) (Patent Number 3,819,334).***

Regarding claims 7-9, Sudar discloses all the claimed limitation as discussed above except a solid catalyst plate is provided in each partial chamber, and the exhaust gas passes through each partial chamber in order and is in contact with the solid catalyst plate of each partial chamber is used as said solid catalyst chamber.

Yoshida teaches that it is conventional in the art, to use solid catalyst plate (2) is provided in each partial chamber, and the exhaust gas passes through each partial chamber in order and is

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in contact with the solid catalyst plate of each partial chamber is used as said solid catalyst chamber (See Figs. 3-7; col. 8, lines 1-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use a solid catalyst plate is provided in each partial chamber, and the exhaust gas passes through each partial chamber in order and is in contact with the solid catalyst plate of each partial chamber is used as said solid catalyst chamber of Sudar, as taught by Yoshida for the purpose of purifying exhaust gas of an internal combustion engine, so as to reduce the poisoned materials in the purifying catalyst and to reduce amount of nitrogen oxides in the exhaust gas of the lean-burn engine, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claims 10-13, Yoshida further discloses at least two solid catalyst plates are provided in each partial chamber (See Figs. 3-7; col. 8, lines 1-57).

***Claims 14-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudar in view of Yoshida as applied to claims 6-13 above, and further in view of Bose.***

Regarding claims 14-23, Sudar in view of Yoshida discloses all the claimed limitation as discussed above except an atomizing mechanism for atomizing the exhaust gas introduced into the liquid reservoir chamber from the introduction portion are provided in the liquid reservoir chamber.

Bose teaches that it is conventional in the art, to use an atomizing mechanism (61), for atomizing the exhaust gas introduced into the liquid reservoir chamber from the introduction portion are provided in the liquid reservoir chamber (See Figs. 1-2; col. 8, lines 6-42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use an atomizing mechanism for atomizing the exhaust gas introduced into the liquid reservoir chamber from the introduction portion are provided in the liquid reservoir chamber of Sudar in view of Yoshida, as taught by Bose for the purpose of purifying exhaust gas of an internal combustion engine, so as to reduce the poisoned materials in the purifying catalyst and to reduce amount of nitrogen oxides in the exhaust gas of the lean-burn engine, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claims 24-33, Bose further disclose that the exhaust gas passing through a member (61) provided with a plurality of small holes juxtaposed in an up-and-down direction of the liquid reservoir chamber and atomized by the small holes is used as said atomizing mechanism (See Figs. 1-2; col. 8, lines 6-42).

#### ***Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of five patents:

Denning (Pat. No. 3729900), Simuni (Pat. No. 5175998), Chang (Pat. No. 5633481), Bowden (Pat. No. 3642259), and Alliger (Pat. No. 3768981) all disclose an exhaust gas purification for use with an internal combustion engine.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (571) 272-4865. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (571) 272-4859. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BT  
March 18, 2005



Binh Q. Tran  
Patent Examiner  
Art Unit 3748